



2014-2015 SBA Water Quality

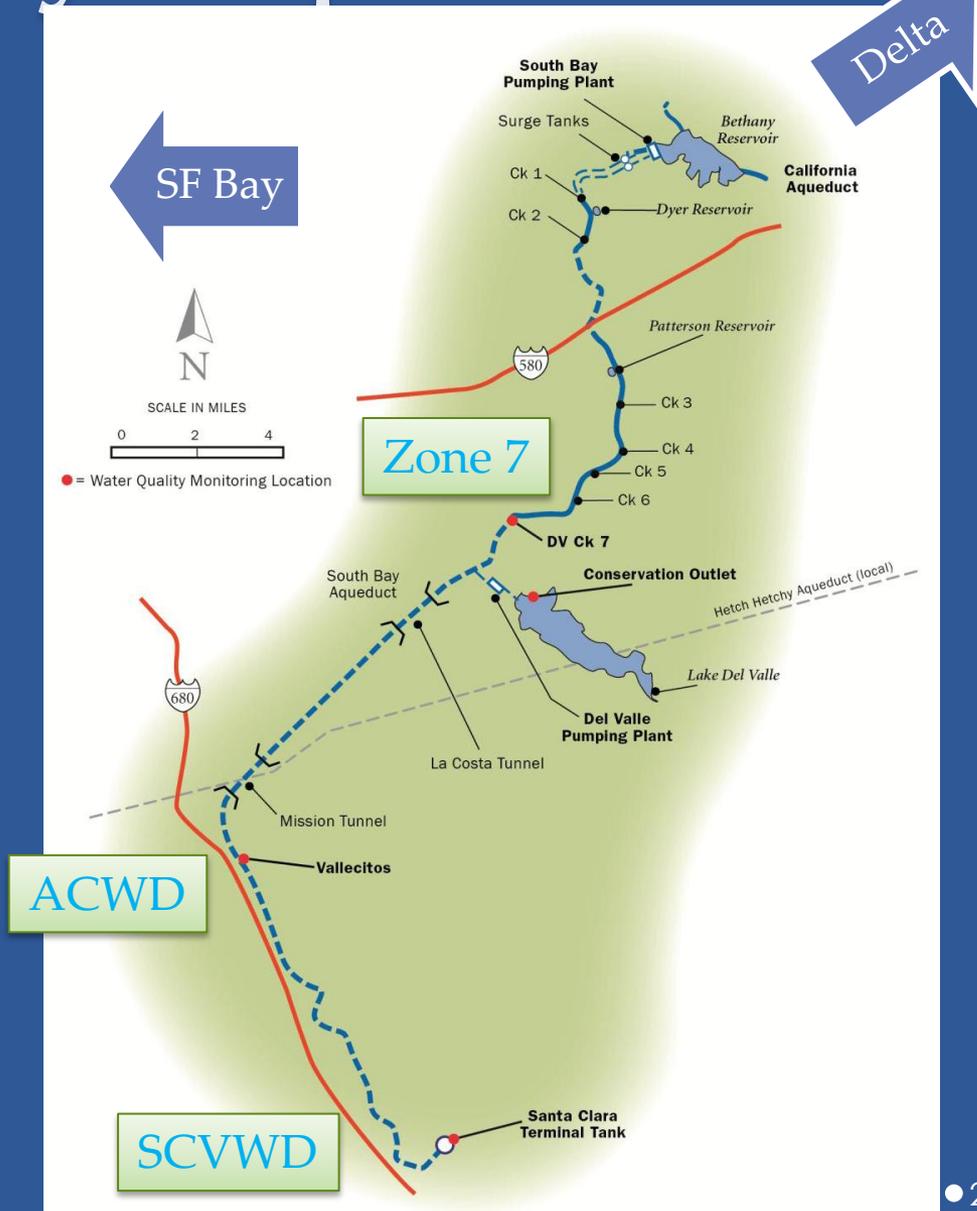
Lyda S. Hakes, ACWD

Brian Keil, Zone 7

Laura Young, SCVWD

South Bay Aqueduct

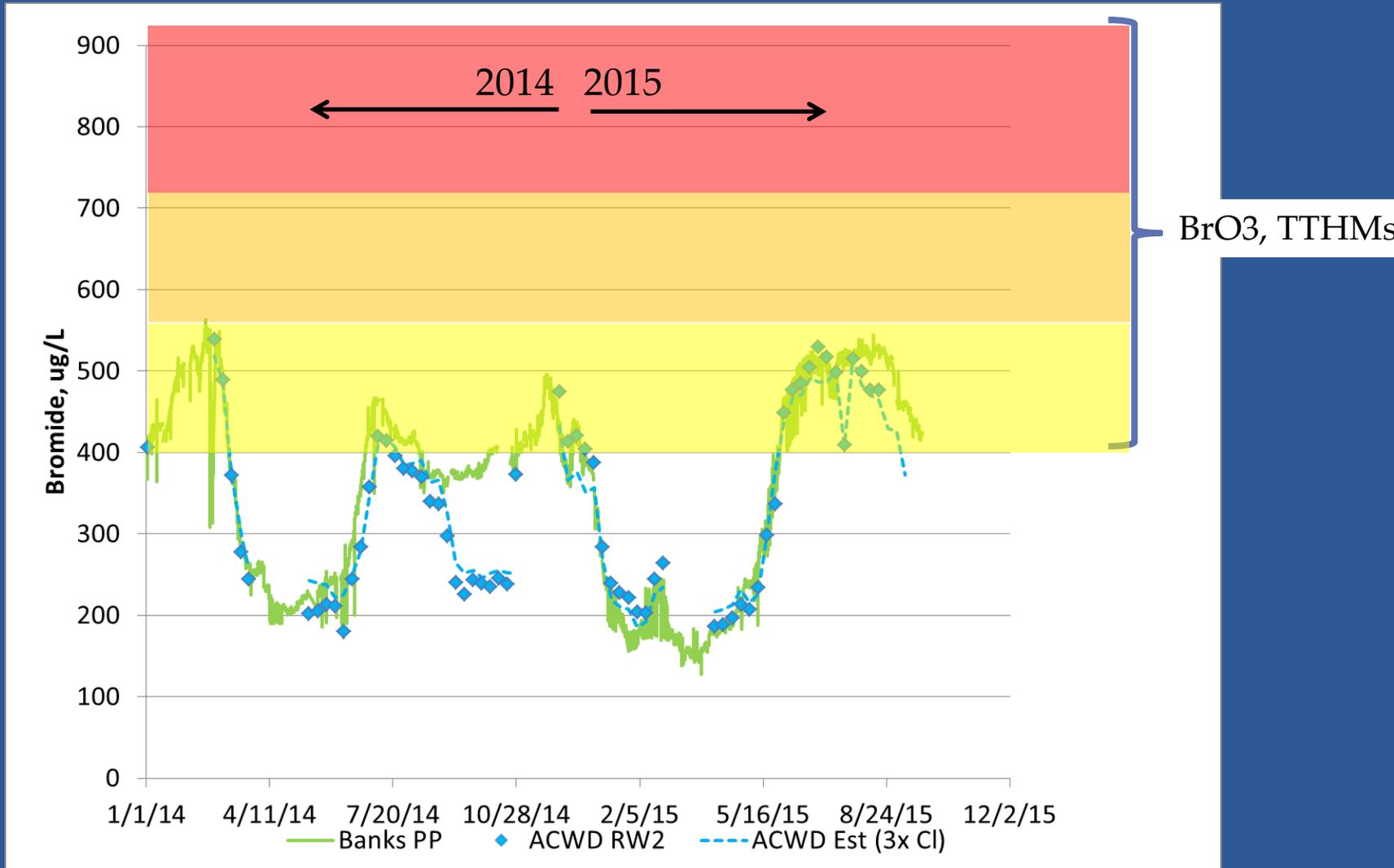
- State Water Project fed by two sources
 - Delta
 - Lake Del Valle
- 10.8 miles of canal
- 32.1 miles of pipeline
- 1.8 miles of tunnel
- Max annual allocation
 - Zone 7: 80,619 AFA
 - ACWD: 42,000 AFA
 - SCVWD: 100,000 AFA
- Lifeline to the Bay Area



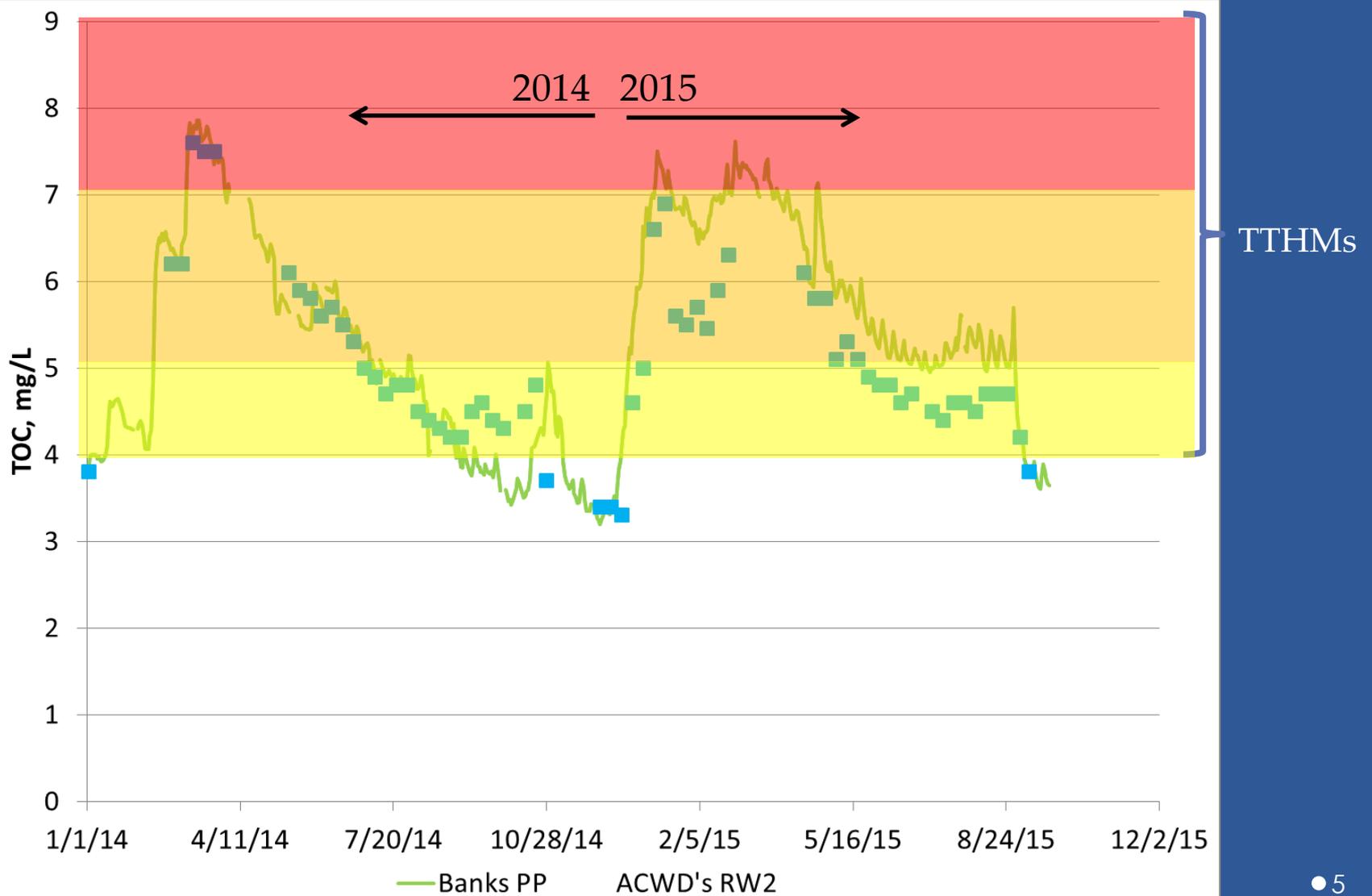
SBA Treatment Plant Processes

Process	Zone 7 Water Agency		Alameda County Water District	Santa Clara Valley Water District	
	DVWTP	PPWTP	WTP2	PWTP	RWTP
Coagulant	Ferric	Ferric	Ferric	Alum	Alum
Filtration	Conv	UF, Conv	Conv	Conv	Conv
Preozone			✓		
Intermediate Ozone				✓	
Chlorine	✓	✓	✓	✓	✓
Chloramine	✓	✓	✓	✓	✓
PAC Adsorption	✓	✓		✓	✓

Bromide, ug/L



TOC, mg/L

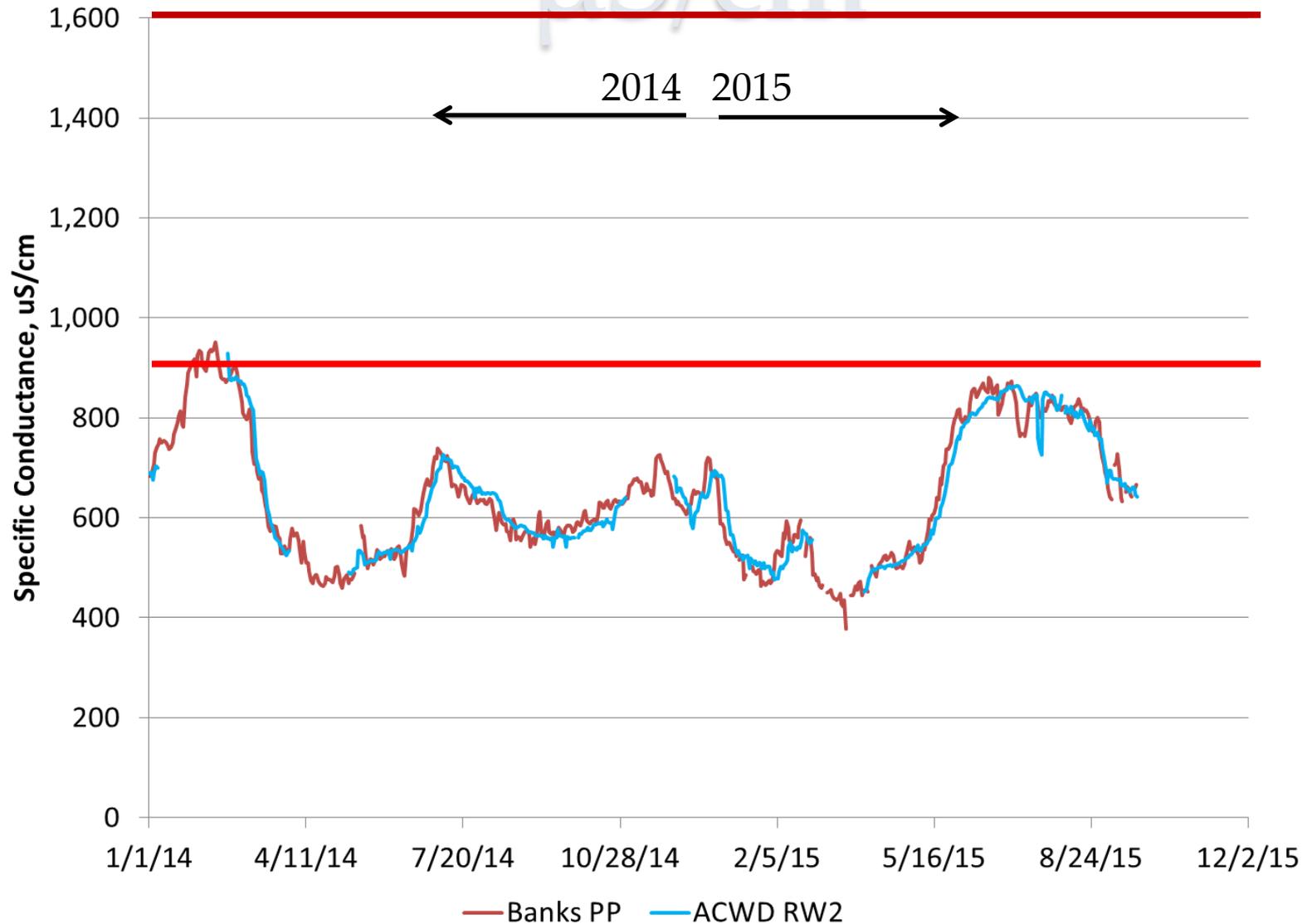


Electrical Conductivity, $\mu\text{S}/\text{cm}$

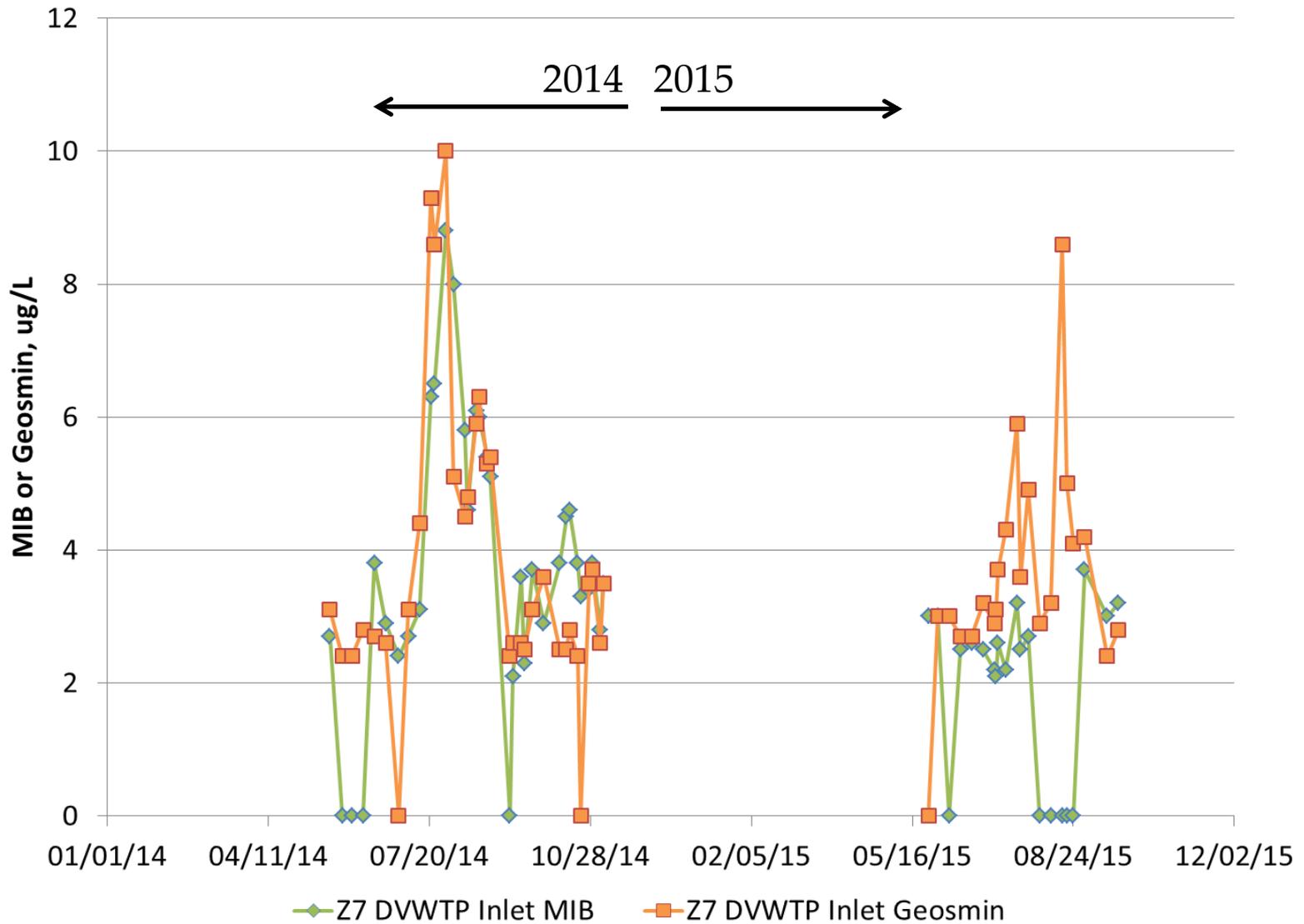
Short-term
SMCL

Upper
SMCL

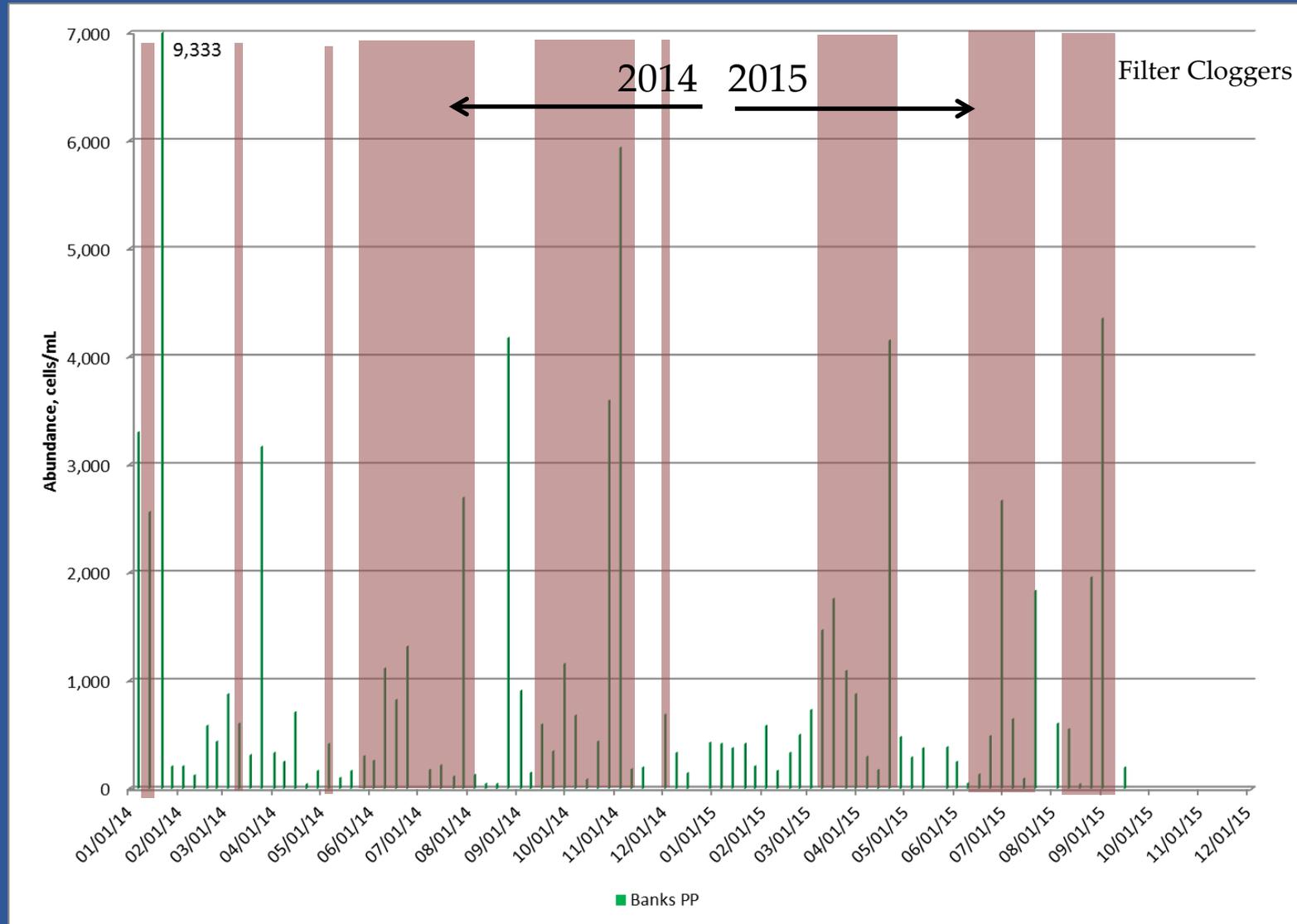
Rec.
SMCL



T&O



Algae



Cyanotoxins

SWP Cyanotoxin Monitoring - 2015

Last updated: 7/16

Sample analysis conducted by Greenwater Laboratories, Palatka, Florida (see Methods worksheet for

Delta Field Division

*Date	Clifton Court FB Inlet				Dyer Reservoir Outlet				Banks Pumping Plant				Lake Del Valle (1 m)			
	MC	CYN	STX	ANT	MC	CYN	STX	ANT	MC	CYN	STX	ANT	MC	CYN	STX	ANT
	04/20/15	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt			
5/18-19/2015	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt				
05/26/15																
6/8-9/2015	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt				
06/17/15																
06/22/15	npt	npt	npt	npt	ND	ND	ND	ND	npt	npt	npt	npt				
06/23/15													npt	npt	npt	npt
07/06/15	0.37	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt				
07/15/15																
07/20/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND				
07/22/15													ND	ND	ND	ND
08/10/15	0.17	npt	npt	npt	ND	ND	ND	ND	npt	npt	npt	npt				
08/19/15																
08/24/15	0.26	npt	npt	ND	ND	npt	npt	npt	ND	ND	ND	ND				
08/25/15													npt	npt	npt	npt
08/31/15	0.47	npt	npt	npt					0.24	npt	npt	npt				
09/14/15	0.29	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt	npt				

Units = ug/L

Toxins – Microcystins (MC), cylindrospermopsin (CYN), saxitoxin (STX), anatoxin-A (ANT)

ND = Not detected above the LOD;

"npt" = No potential toxin producers observed by microscopy and ELISA analysis not conducted

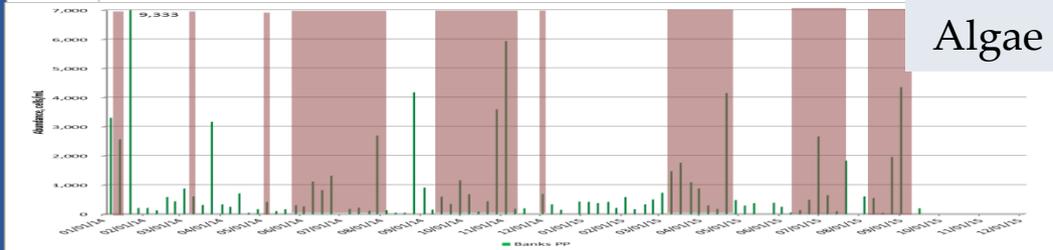
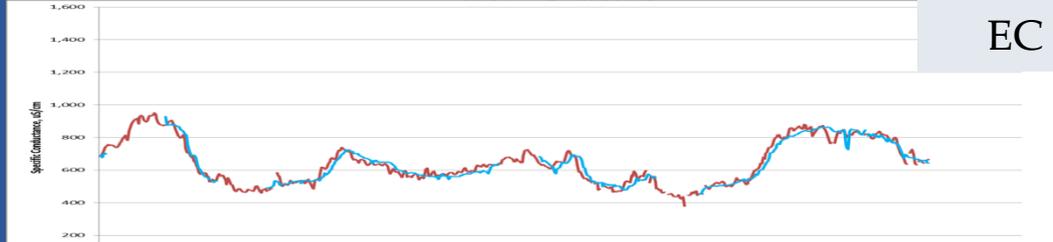
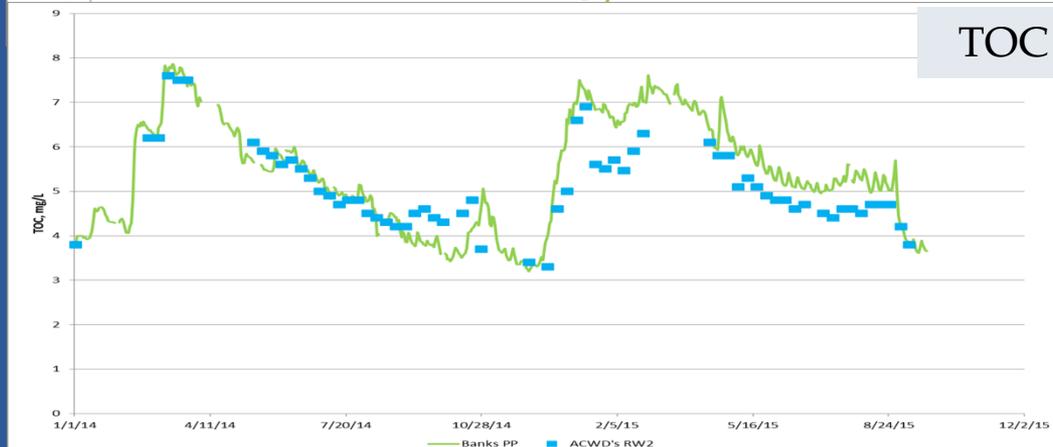
LOD = 0.05 ug/L (ANT & STX), 0.1 ug/L CYN, 0.15 ug/L MC

** Indicates LC/MS conducted to determine concentration of microcystin variants (see MC-variant worksheet)



UNATED FEATURE SYNDICATED

Challenging Water!



SBA-wide Tools

- Request Copper Sulfate Treatment
 - + Controls algal biomass in canals
 - Can result in treatment impacts (short-term)
 - Requires GW recharge off-line
- Request Blend from Lake Del Valle
 - + Improves quality & treatability
 - Requires balancing of interests



*Lake Del Valle,
Typical operating range: 25,000 to 40,000 AF*

ACWD's WTP2 Process Control Options

	Ozone	Ferric	pH	Pre-chlor	Flow rate
TOC	↑	↑	--	--	--
Bromide	↓	--	↓	↑	--
Algae	↑	--	↓	--	↓
T&O	↑	--	--	--	↓
Turbidity	↑	↑	--	--	↓
DRAWBACKS & IMPACTS	BrO ₃ , \$\$\$	\$\$\$, Solids, Color, Caustic, Coagulation	\$\$\$, Caustic, Coagulation	\$	\$\$\$, Production, supply optimization



ACWD's Treated Water Quality

We are managing...

- Bromate
 - RAA = 2.12 ug/L
- TTHMs
 - Leaving WTP2 avg = 29 ug/L, max = 43 ug/L
- T&O
 - Minimal complaints
- Filtration rates
 - Consistent with ozone on-line

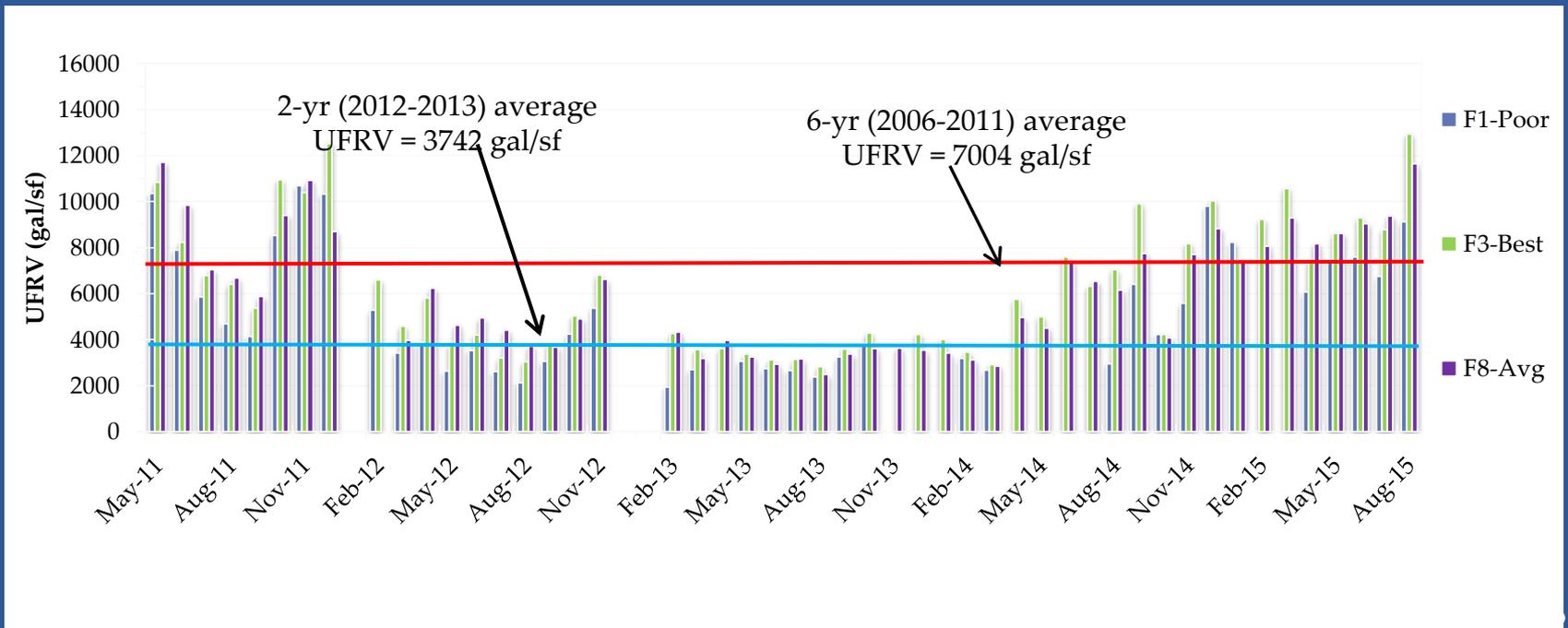
...with effort!

- Increased chemical dosages
 - Ferric, ozone, chlorine, caustic & CO₂
- Cautious bromate control
- Elevated T&O complaints in July 2014
- Highest-ever ozone demand in April 2015
- Major filtration challenges with ozone outage

Zone 7

Del Valle Water Treatment Plant Performance

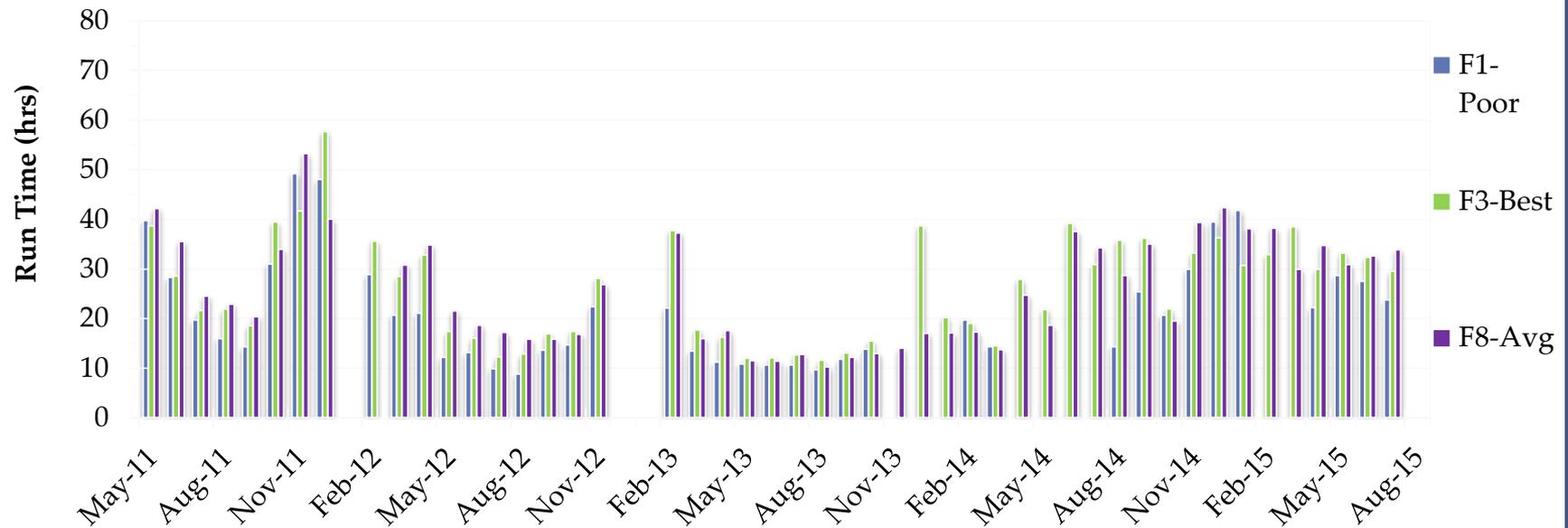
- UFRVs before and during drought conditions
- 6 year bench mark from 2006-2011 for “normal years”
- 2 year benchmark from 2012-13 for “drought years”



Zone 7

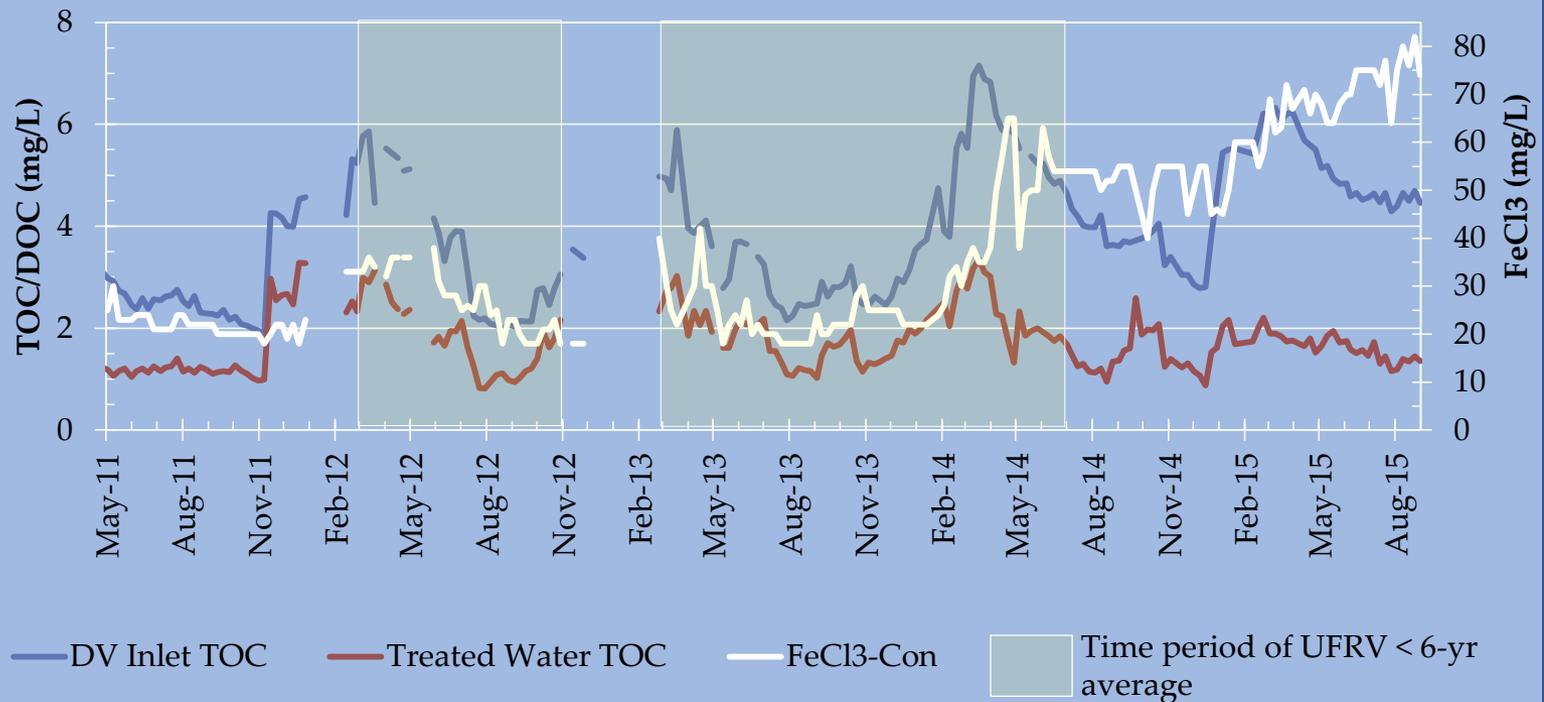
Del Valle Water Treatment Plant Performance

- ▶ Extremely short filter runs (< 10 hours) in some months.
- ▶ Significant performance limiting factor requiring constant backwashing of filters.



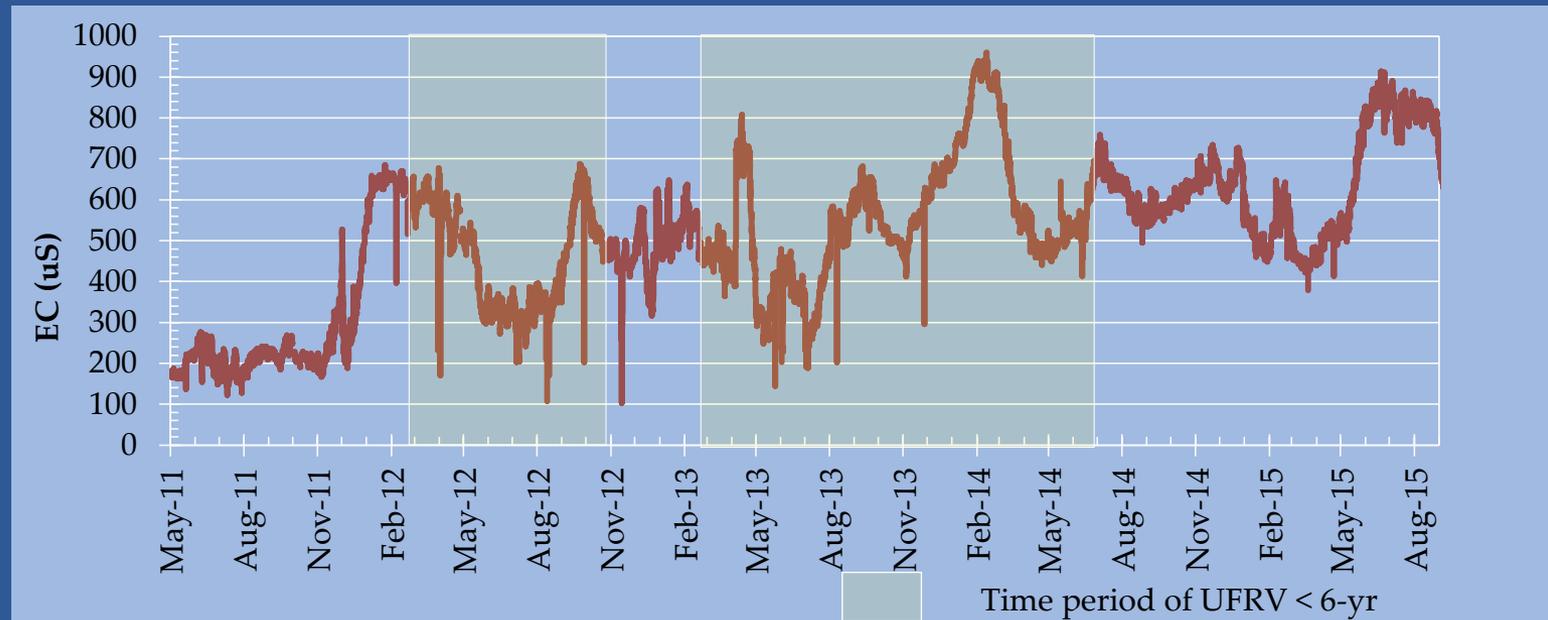
TOC

- ▶ Elevated levels of TOC have negative impact on filter performance.
- ▶ Increased coagulant dose (ferric chloride) greatly improved filter UFRVs
 - Increased sludge production



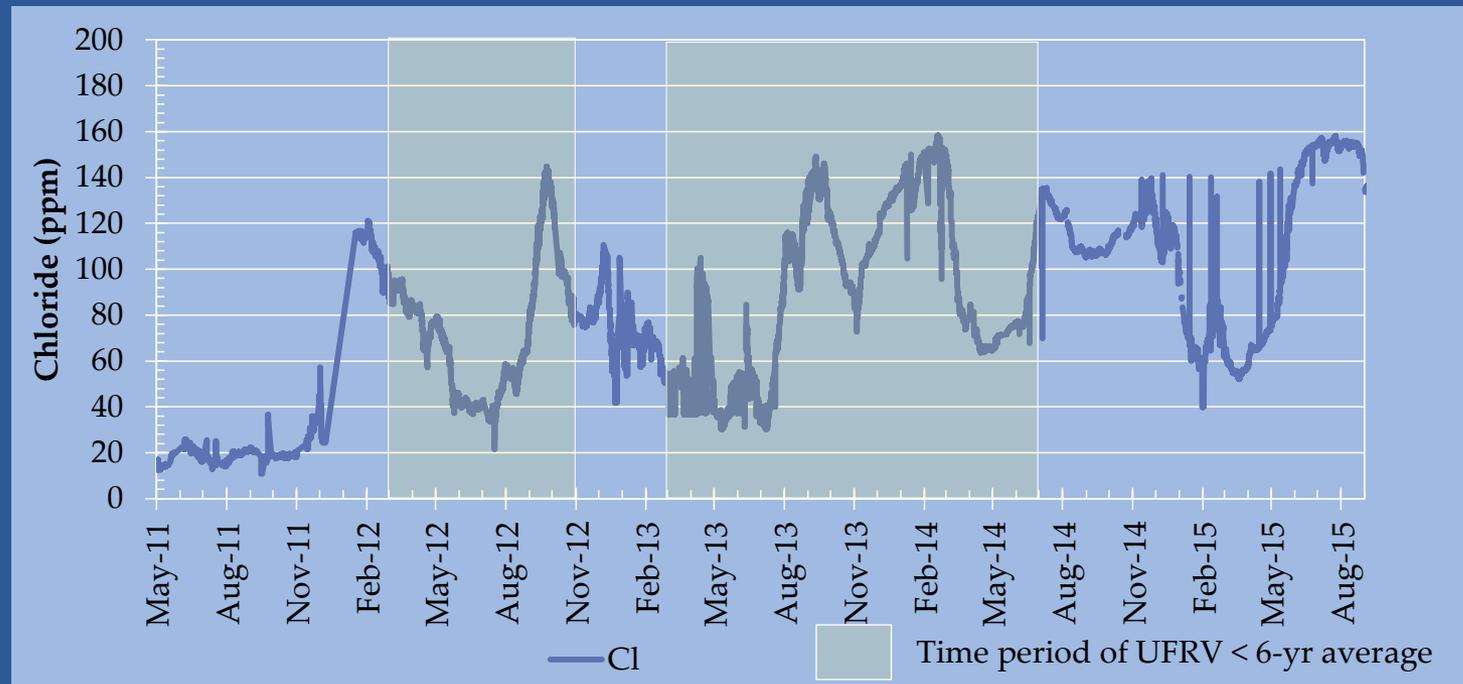
EC

- Elevated EC also negatively affecting coagulation and filter performance
 - EC range “pre-drought” ~100 μS to ~750 μS
 - EC range “drought-period” ~250 μS to ~950 μS



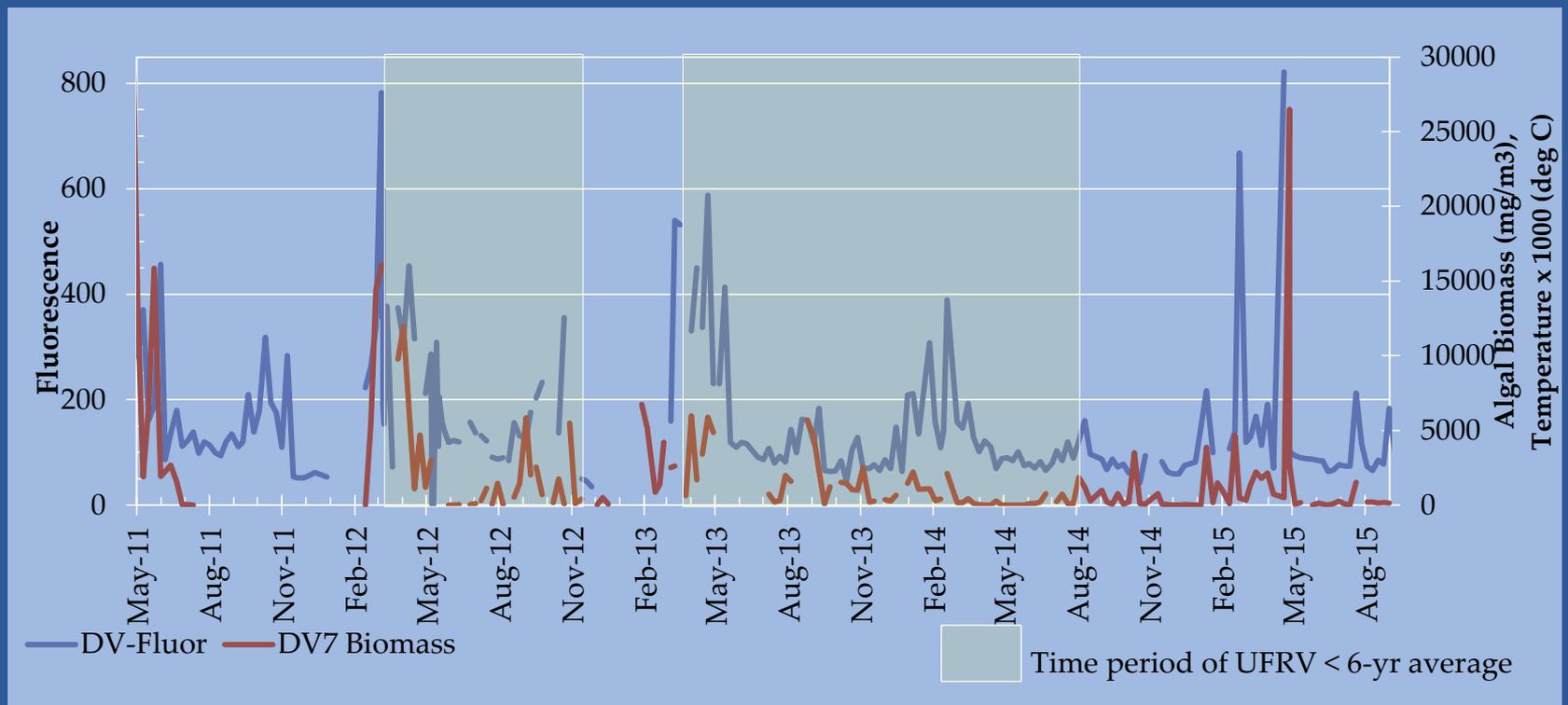
Chloride

- ▶ Elevated Chloride levels
 - Cl range “pre-drought” 15 ppm to 120 ppm
 - Cl range “drought-period” 25 ppm to 160 ppm

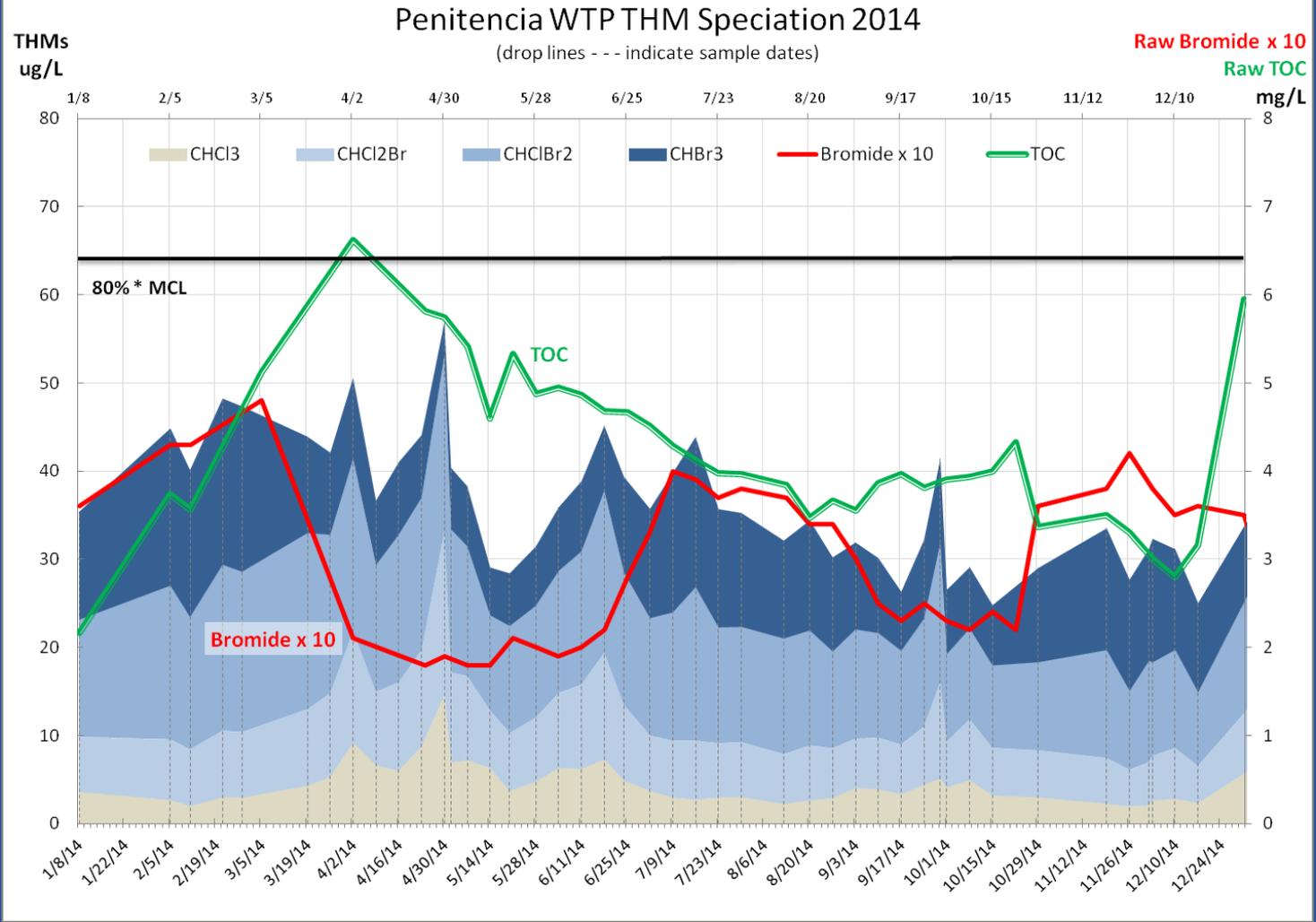


Algal Growth

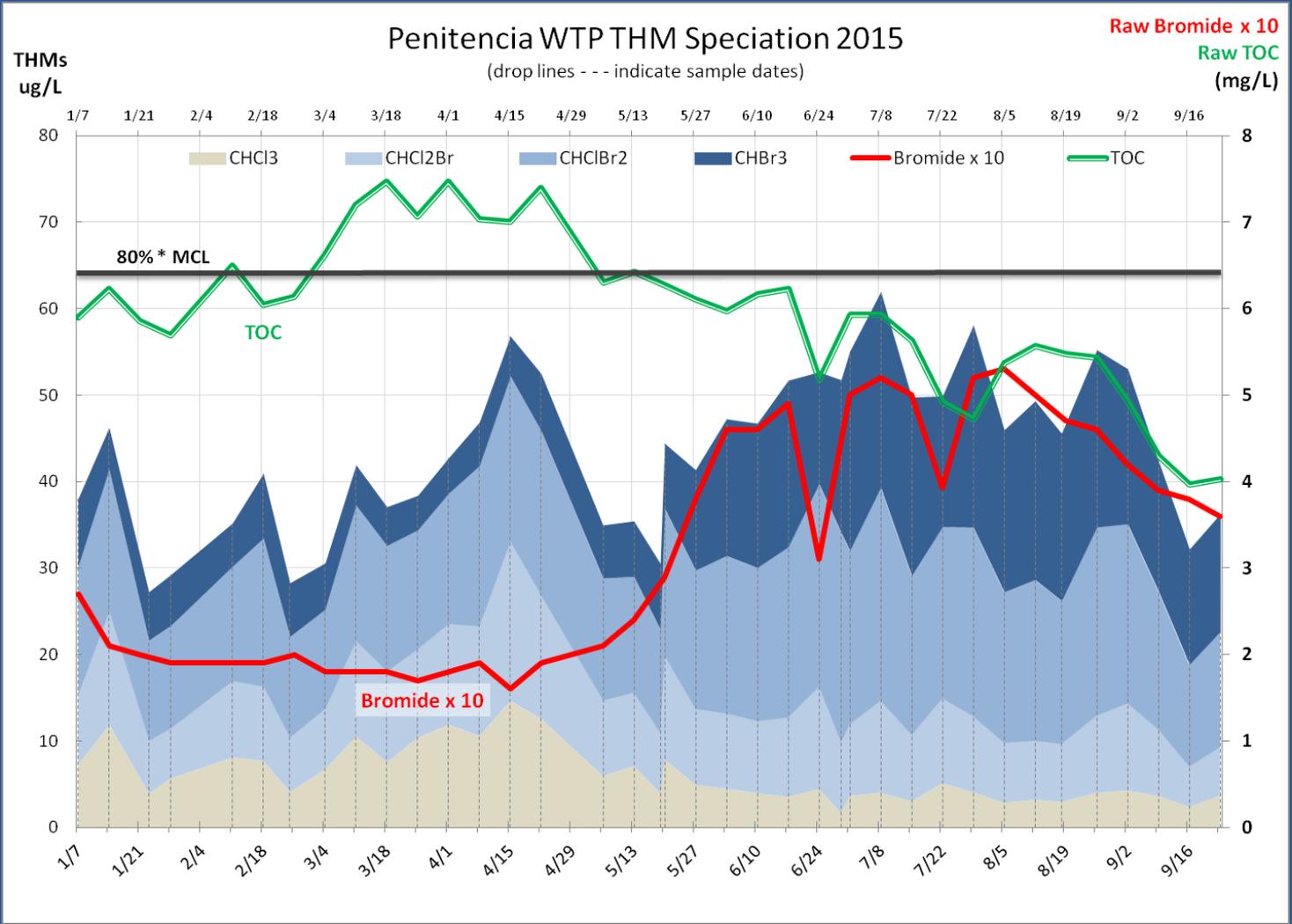
- ▶ Increased Algal Growth in SBA during the drought



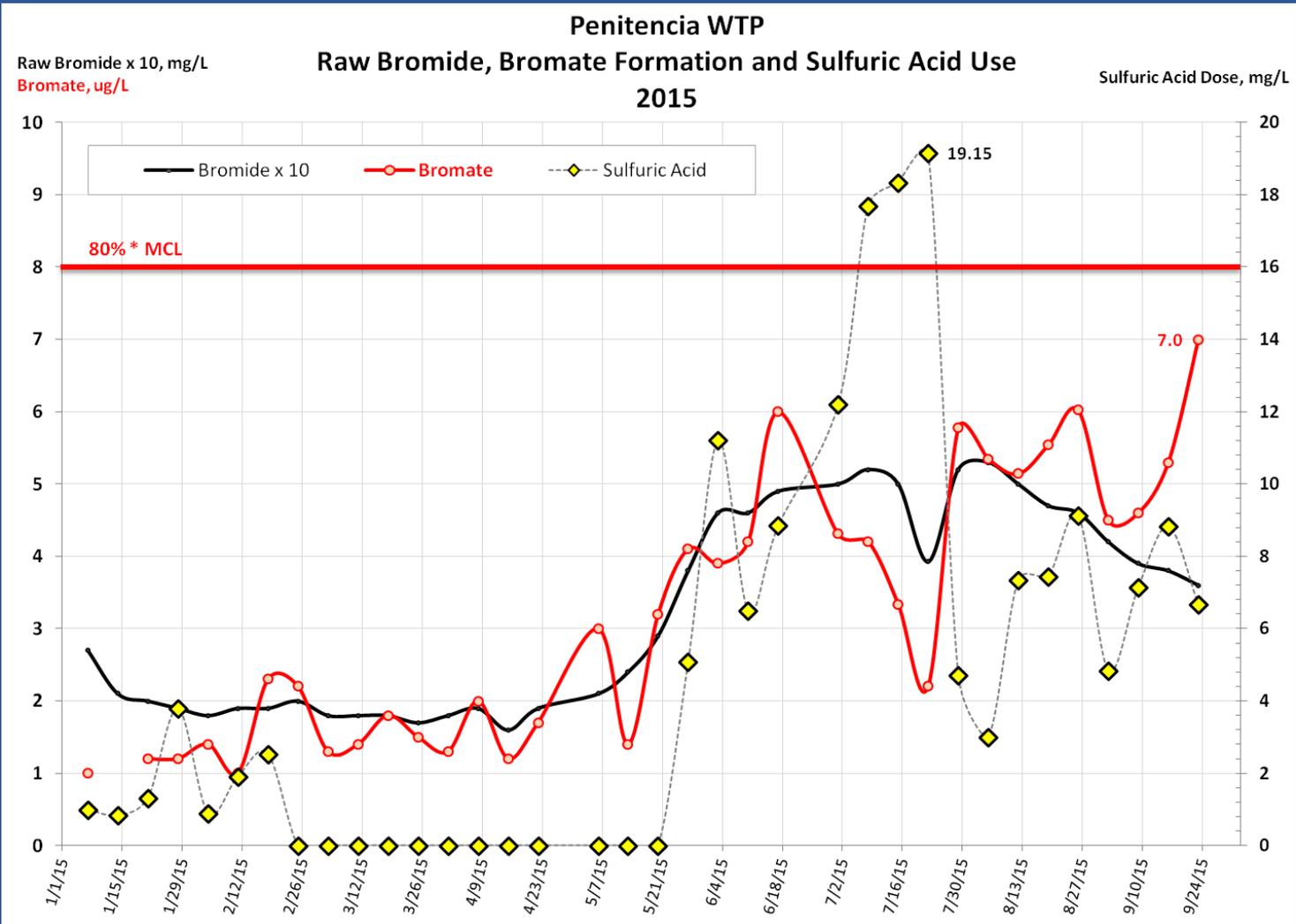
SCVWD



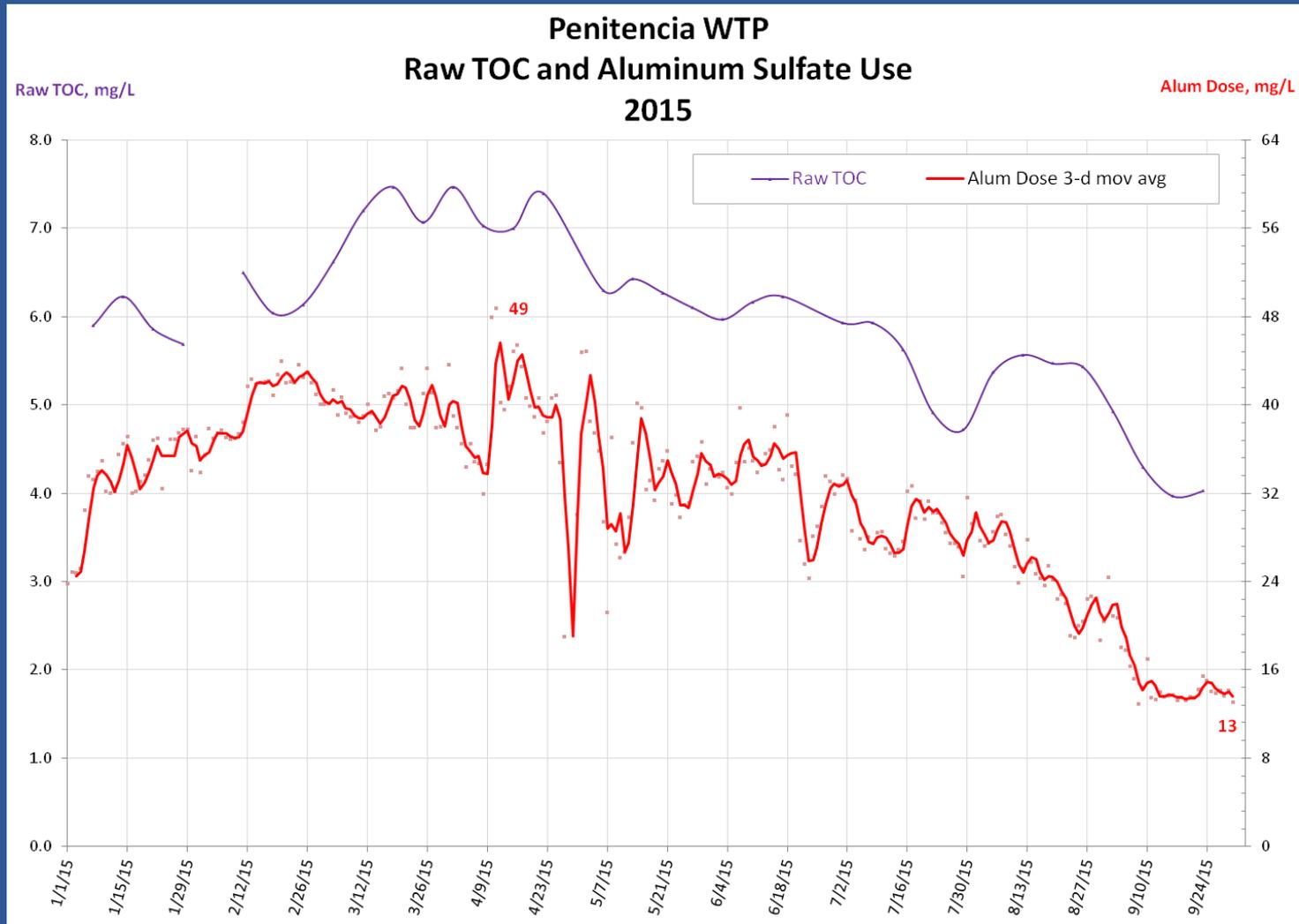
SCVWD



SCVWD



SCVWD



SCVWD

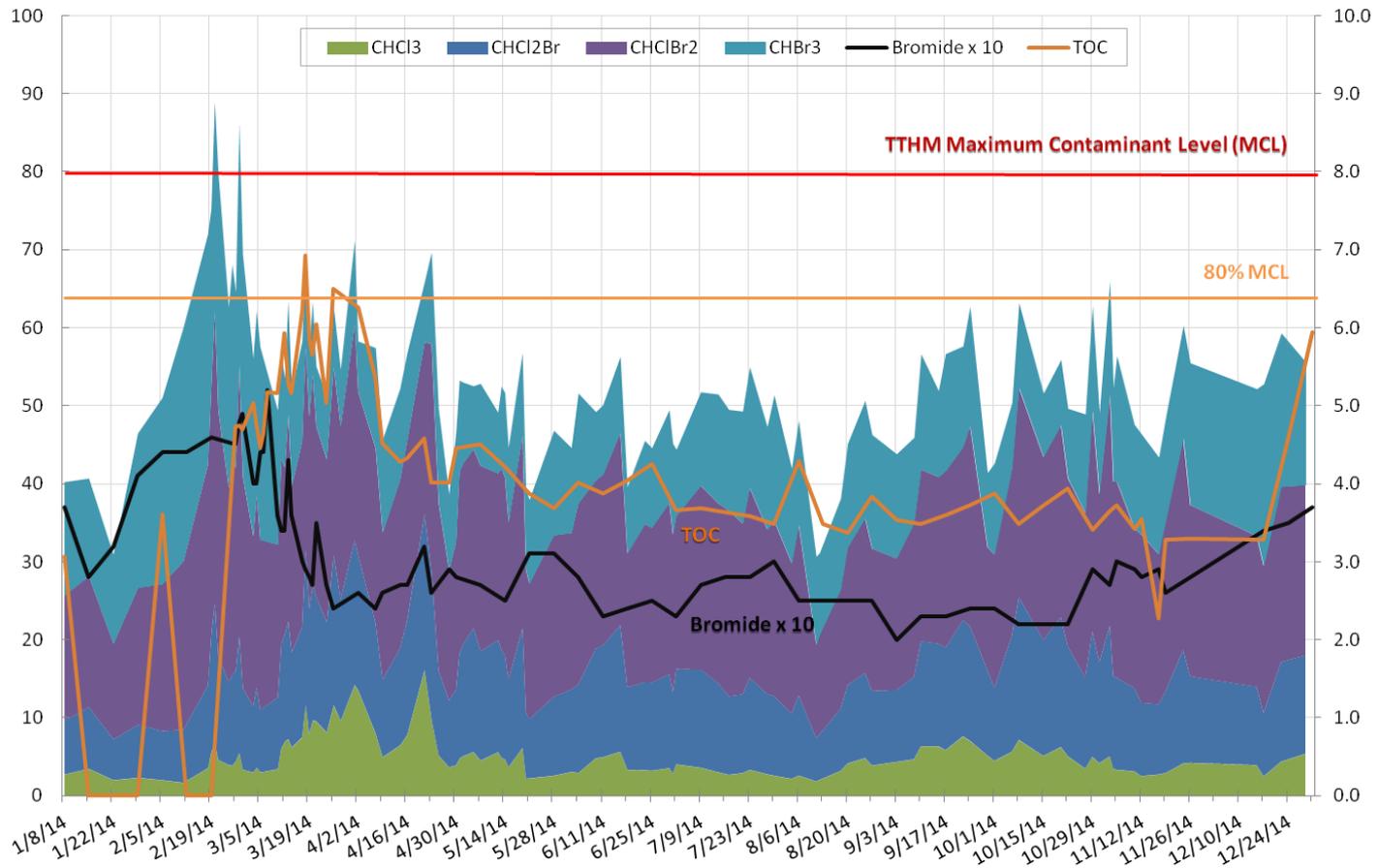
Rinconada WTP THM Speciation 2014

THM (ug/L)

(drop lines --- indicate THM sample dates)

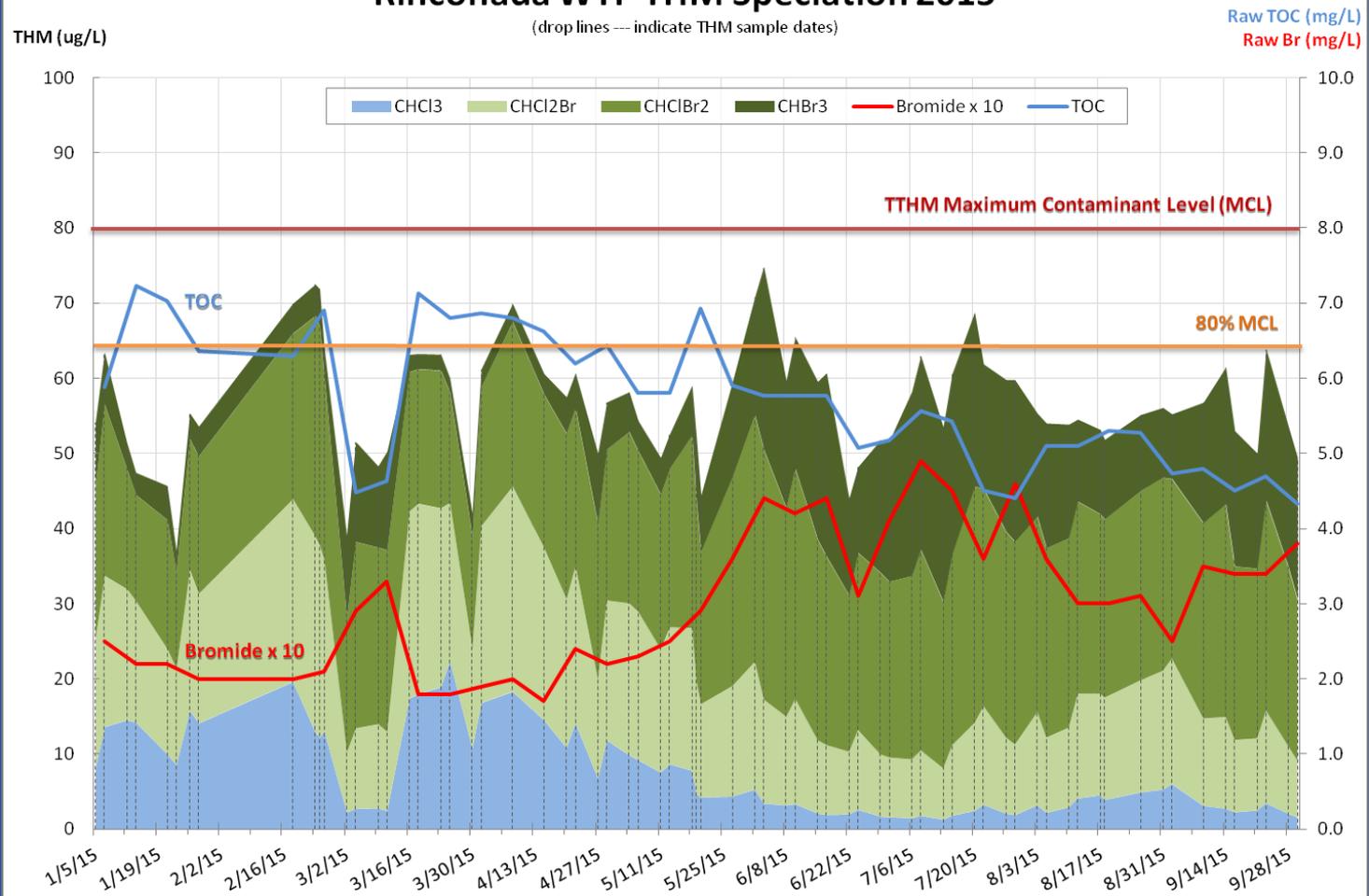
Raw TOC (mg/L)

Raw Bromide x 10 (mg/L)



SCVWD

Rinconada WTP THM Speciation 2015

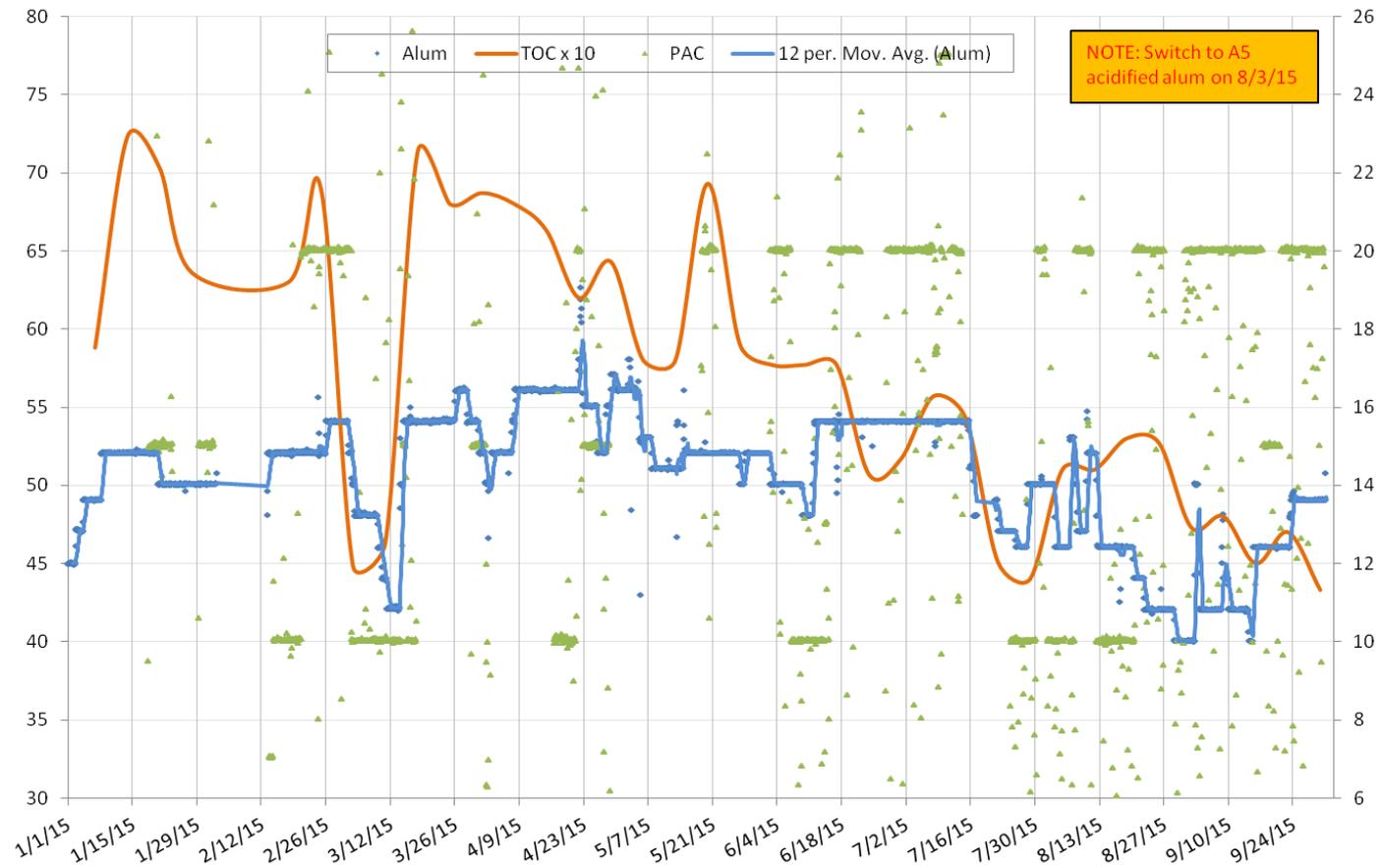


SCVWD

Rinconada WTP 2015 Raw TOC, PAC and Aluminum Sulfate Use

Alum Dose (mg/L)
Raw TOC (mg/L)

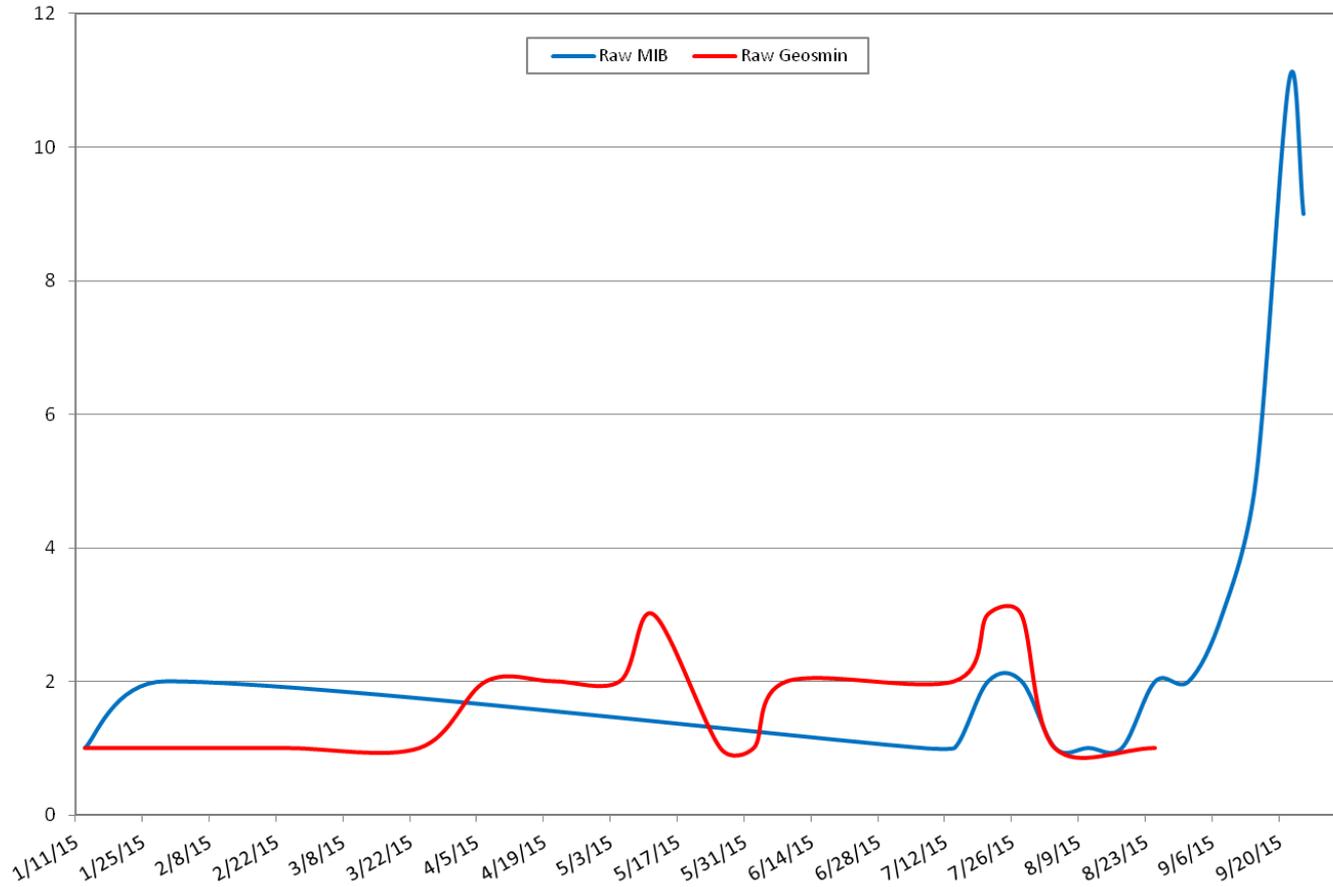
PAC (mg/L)



SCVWD

RWTP Taste & Odor

MIB, Geosmin (ng/L)



Questions?

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